SECTION 02820

FENCE AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Provide Chain Link Fence, complete with bases, accessories and incidental work as shown or specified.
   2. Gates.

B. Related Work Specified In Other Sections:
   1. Earthwork - Division 2.
   2. Access Control Security Systems – Division 1 General Requirements.

C. Provided By Owner:
   1. Padlocks for gate latch.

1.2 SUBMITTALS

A. Furnish submittals for items identified in this Section by different typefaces and bracketed code letters (e.g., *Item [L]*). Refer to Division 1 General Requirements for definition of codes for types of submittals and administrative requirements governing submittal procedure. Additional submittal requirements concerning this Section are specified under this Article.

B. *Shop Drawings [D]:* Show plan layout, fence height, sizes and gages of components, gates, hardware, bases and erection details. Also, submit gate and gate operator details.

C. *Product Data [P]:* Submit data describing each component's material, shape, and finish; and manufacturer's erection and installation instructions.

1.3 QUALITY ASSURANCE

A. Qualifications
   1. Chain Link Fence Manufacturer's Institute publications as follows:
      a. Specification for Galvanized Steel Chain Link Fence Fabric.
      b. Industrial Steel Specifications for Fence-Posts, Gates, and Accessories.
      c. Standards for Chain Link Fence Installation.
   2. Installer Qualifications
      a. The Chain Link Fence and Gates installation firm shall have experience in similar size and complexity fence work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Master Halco.

B. Cyclone Fence by U. S. Steel Supply, Division of United States Steel.

C. Fence Division, Allied Tube & Conduit.

D. Page-Wilson Corp.

E. Semmerling Manufacturing Corp.

2.2 MATERIALS

A. Protective Coating
   1. Coating for ASTM A 1011, "Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability", Pipe:
      a. External.
         1) One ounce (0.1 oz.) or more of zinc per square foot,
         2) 30 micrograms or more
         3) 15 micrograms chromate, and
         4) 0.5 mils and 0.2 mils clear cross-linked polyurethane acrylic.
      b. Internal. Zinc-rich based organic coating with minimum 87% zinc powder, capable of providing galvanic protection.
   2. Gate Panel:
      a. Chain Link Fence Gate Panel: Gate panel shall be manufactured with galvanized steel pipe meeting requirements in ASTM F 900, "Standard Specification for Industrial and Commercial Swing Gates". Gate frame shall be welded to form ridged panel.
      b. Outer Support Members:
         1) Grade A steel pipe 1.9000 inches O.D. weighing 2.72 lbs. Per lin. Ft.
         2) Grade B steel tubing 1.900 inches O.D. weight may differ depending on manufacturer. Product shall be equal to SCH 40.
      c. Inner Support Members:
         1) Grade A steel pipe 1.660 inches O.D. weighing 2.27 lbs. Per lin. Ft.
         2) Grade B steel tubing 1.660 inches O.D. weight may differ depending on manufacturer. Product shall be equal to SCH 40.
   3. Finish:
      a. Galvanizing: Exposed system parts shall be zinc galvanized.

2.3 MANUFACTURED UNITS

A. Fabricate gate leaf frames from tubular members. Provide additional horizontal and vertical members to ensure proper gate operation and for attachment of fabric and hardware.

B. Weld gate frames or assemble with special malleable or pressed steel fittings and rivets to develop rigid connections. Install fabric with stretcher bars at edges. Secure fabric and stretcher bars with bands at not over 15 inches on center. Attach hardware with rivets or by other rigid means to ensure against breakage or removal of hardware.

C. Provide diagonal cross bracing with adjustable truss rod on gates to obtain frame rigidity and freedom from sag or twist.

2.4 COMPONENTS

A. Fabric: Zinc-coated, No. 9 gage, steel wire, 2 inch diamond mesh, per ASTM A 392, "Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric", Class 1, with twisting and barbing on both selvages.

B. Tie Wire: Zinc-coated No. 9 gage, steel wire Class C, spaced 14 inches, 356 mm on center for tying fabric to line posts and 24 inches, 610 mm on center for tying fabric to top rails and bracing.

C. Posts: Zinc-coated, steel pipe of diameters and weights specified, per ASTM A 123, "Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products", ASTM A 1011, "Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability","C" Section of size and minimum bending strength specified, or of equivalent section as regularly furnished by manufacturer, for each function, as listed.

POSTS	**PIPE, A 120**		**"C" Section**		**PIPE, A 569**	
Function	**OD (inch)**	**WT/LF (lbs)**	**Size (inch)**	**WT/LF (lbs)**	**OD (inch)**	**WT/LF (lbs)**
Line	2.375	3.65	2.25 by 1.7	3.26	2.5	3.12
End, pull & corner	2.875	5.79	3.5 by 3.5	4.85	3.0	4.64
Gate Up to 5 ft.; 12 ft. Double; 15 ft. sliding	2.875	5.79	—	—	3.0	4.64
6 ft. to 13 ft; 12/26 double; over 15 ft. sliding	4.0	9.11	—	—	4.0	9.11

D. Gate Frames: Zinc-coated, steel pipe, per ASTM A 123, "Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products", 1.90 inch OD, 2.72 lbs/linear foot, or equivalent section as regularly furnished by manufacturer, or ASTM A 1011, "Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability", cold-formed electric welded pipe 2.0 inch OD, 2.28 lbs/linear foot.

E. Top Rails: Zinc-coated, steel pipe 1.625 inch OD, 2.27 lbs/linear foot or 1.625 inch by 1.25 inch channel section, or ASTM A 1011, “Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability”, steel pipe, 1-5/8 inch OD, 1.84 lbs/linear foot Furnish in manufacturers standard lengths of roughly 21 feet. Provide 6-inch long couplings at each joint with expansion couplings at every 5 joints, or less.

F. Center Rails: Provide center rails for fabric heights exceeding 12 feet - 0 inches, as follows. Zinc-coated, steel pipe 1.66 inch OD, 2.27 lbs/linear foot

G. Bracing: Zinc-coated, ASTM A 123, “Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products”, steel pipe 1.625 inch OD, 2.27 lbs/linear foot and 3/8 inch diameter adjustable truss rod or 1.625 inch by 1.25 inch channel section, or ASTM A 1011, “Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability”, steel pipe 1-5/8 inch OD, 1.84 lbs/linear foot

H. Tension Wire: Zinc-coated No. 7 gage, coiled spring steel wire.

I. Supporting Arms: Zinc-coated, steel or iron with provisions for attaching 3 strands of barbed wire on single arm and for attaching to top of each post.

J. Post Tops: Zinc-coated, steel or iron weathertight closure cap, formed to support top rail.

K. Fabric Stretcher Bars: 3/16 inch by 3/4 inch minimum, zinc-coated steel bars, or equivalent cross-sectional area, placed at each gate, end, corner and pull post, secured to post by steel or iron bands, spaced not over 15 inches on center.

L. Manual Gate Hardware: Manufacturer’s standard items incorporating following features. Steel hinges, non-lift-off type, offset to permit 180 degree gate opening; forked type or plunger-bar type latch to permit operation from each side of gate, equipped with integral padlock eye. Provide keeper on vehicular gate to automatically engage and hold gate leaf open until manually released. Provide gate stop for double leaf gate set in concrete to engage plunger bar with locking device and padlock eye as an integral part of latch assembly.

M. Concrete
   1. Concrete: Air-entrained, 28-day compressive strength of 3000 PSI, per ASTM C 94, “Standard Specification for Ready-Mixed Concrete”.

N. Protection Screen
   1. Protection Screen: Zinc-coated, fully-welded assembly of 1/2 inch diameter steel rods, spaced 8 inches on center both ways.

PART 3 EXECUTION

3.1 PREPARATION

A. General
   1. Do not install fence until final grading is complete and finish elevations are established.
   2. Provide miscellaneous clips, bolts, nuts and other hardware items necessary to complete installation.

B. Excavation
   1. Drill holes for post bases as shown. Spread excavated material in area on Owner's property where directed.
   2. Space line posts at not more than 10 feet on center.

3.2 INSTALLATION

A. Bases
   1. Locate bases accurately to alignment and grade. Place concrete around posts in continuous pours and rod concrete to eliminate voids. Make posts plumb and true with vertical tolerance of 1/4-inch and hold in position during placement and finishing of concrete. Extend bases to 2 inches above grade. Slope or dome top to shed water away from posts and finish trowel exposed surfaces. Keep exposed concrete moist and let set for at least 7 days after placement.

B. Sequence
   1. Do not stretch fabric and wire and do not hang gate until concrete has attained its full design strength. Install top rails, tension wire and fabric no sooner than 7 days after concrete placement or after concrete has attained 75% of its design strength.

3.3 ERECTION

A. Run top rails continuous through post tops with coupling at each joint and expansion coupling at every 5 joints, or less. Set center rails flush with posts on fabric side, using offset fittings.

B. Install gates with hinges fastened securely to prevent twisting. Install fabric to match fencing. Adjust hardware for smooth operation.

C. Pull fabric taut and tie to posts, rails, and tension wires with wire ties and bands. Install fabric on security side of fence. Shape tie wires to posts and rails and twist ends. Install nuts for bolts on side of fence opposite fabric side, with end of bolts peened to prevent removal of nuts. Provide 1 brace at each gate post. Provide 2 braces at each end, corner and pull posts. Locate horizontal brace at mid-height of fabric.

D. Install protection screen at ditch and secure screen to line posts at edge of ditch.

3.4 CLEANING

A. Clean galvanized surfaces damaged during installation. Repair with galvanizing repair paint.

END OF SECTION

Revision History	
Date	**Rev. No.**
E	0
F	0
02-19-09	0

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